Guaiac versus immunochemical tests:

Faecal occult blood test screening for colorectal cancer in a rural community

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Word count: abstract 249; text 3,766; references (40) 1,067

Acknowledgements

The BowelScreen Program depended on contributions from many others in addition to the authors, including the active support of local General Practitioners and their staff. We would also like to thank Mrs Vanessa Beesley for her assistance with administration of the project and data management. This research was funded by Queensland Health. In addition, funding was subsidised by Enterix (Inc), which made the !nform FOBT kit and its analysis available at a highly discounted rate, and the pathology laboratory at Townsville General Hospital, which provided analysis of Hemoccult-II kits at a greatly reduced fee. Finally, we would like to acknowledge the constructive criticism provided by three anonymous reviewers, whose comments helped make this paper suitable for publication.

Statement of competing interests

Queensland Health, Enterix (Inc), and Townsville General Hospital pathology had no role in data analysis, interpretation or writing the article. These supporting sources did not control or influence the decision to submit the final manuscript for publication. Queensland Health, but not the others, contributed to the study design by requesting that the colorectal cancer screening demonstration project compare guaiac and immunochemical tests. Enterix (Inc) and Townsville General Hospital Pathology Laboratory contributed to data collection by generating the faecal occult blood test results from samples submitted by study participants.

Abstract

Objective: To describe patient participation and clinical performance in a colorectal cancer (CRC) screening program utilising faecal occult blood test (FOBT).

Methods: A community-based intervention was conducted in a small, rural community in North Queensland, 2000-2001. One of two FOBT kits – guaiac (Hemoccult-II) or immunochemical (!nform) – was assigned by general practice and mailed to participants (3358 patients aged 50-74 years listed with the local practices).

Results: Overall participation in FOBT screening was 36.3%. Participation was higher with the immunochemical kit than the guaiac kit (OR=1.9, 95% CI: 1.6,2.2). Women were more likely to comply with testing than men (OR=1.4, 95% CI: 1.2,1.7), and people in their 60s were less likely to participate than those 70-74 years (OR=0.8, 95% CI: 0.6,0.9). The positivity rate was higher for the immunochemical (9.5%) than the guaiac (3.9%) test ($\chi^2 = 9.2$, p =0.002), with positive predictive values for cancer or adenoma of advanced pathology of 37.8% (95% CI: 28.1%, 48.6%) for !nform and 40.0% (95% CI: 16.8%, 68.7%) for Hemoccult-II. Colonoscopy follow-up was 94.8% with a medical complication rate of 2-3%.

Conclusions: An immunochemical FOBT enhanced participation. Higher positivity rates for this kit did not translate into higher false-positive rates, and both test types resulted in a high yield of significant neoplasia.

Implications: In addition to type of FOBT, the ultimate success of a population-based screening program for CRC using FOBT will depend on appropriate education of health professionals and the public as well as significant investment in medical infrastructure for colonoscopy follow-up.

Reducing mortality from colorectal cancer (CRC) is a national health priority.[1,2] CRC is a significant burden for Australia, affecting about 10,000 Australians and causing about 4500 deaths per year.[3,4] Randomised trials indicate that faecal occult blood test (FOBT) screening can reduce mortality rates by 15-35%,[5-9] and there is considerable interest in a national screening program for Australia.

FOBT screening is based on the principle that cancers bleed into the bowel, and that this bleeding may be detected. There are two main types of FOBTs: guaiac and immunochemical. Guaiac tests detect haem and haemoglobin, whereas immunochemical tests detect only intact human haemoglobin. To minimise false-positive results, dietary restrictions are required when utilising a guaiac test. The large, clinical trials demonstrating reductions in CRC mortality were conducted with guaiac tests, namely Hemoccult and Hemoccult-II.[10] Sensitivity of guaiac tests is usually between 50-80% and specificity is generally over 95%, increasing to 98-99% when dietary restrictions are followed.[1,3] Test positivity rates for guaiac tests such as Hemoccult-II range from 1-5%. The performance characteristics of immunochemical tests, such as HemeSelect, FlexSure OBT and !nform, are less well-established.[11] Reported specificity of immunochemical tests is slightly lower than guaiac tests at 95-98%, but clinical sensitivity for cancer is generally higher. Immunochemical tests display positivity rates of 2-14%.[11]

Reduction in CRC mortality rates from FOBT screening is enhanced by high participation levels in the community.[12,13] Choice of kit is one factor that may influence participation. Dietary restrictions[14] and perceptions of a test as ‘messy’ or ‘disgusting’[15] have been shown to significantly reduce participation. A simplified sampling process[16] and a reduction in the number of required samples are associated with increased participation.[17] This may indicate a preference for immunochemical tests, which have no dietary restrictions and are often designed to be more user-

friendly. However people also tend to prefer the 'status quo' in relation to FOBT screening.[18] In Australia, guaiac tests have been widely circulated by non-profit organisations such as Rotary and Lions – participants may therefore retain a preference for these tests.

Few Australian studies have examined FOBT kit characteristics and participation in a community setting. Fewer still have assessed acceptability in a rural context.[19,20] The present study was a demonstration project designed to describe FOBT screening participation in a rural community, comparing guaiac and immunochemical tests. In an effort to optimise participation, recruitment through general practitioners (GPs) was utilised.[21-23]

Methods

The participants

A rural Queensland community was selected, with a population of approximately 15,000 people (approximately 4,200 were aged 50 years or older).[24] There were four general practices located in the region, with 10 GPs. The community is located within a 90-minute drive of an urban centre with the necessary infrastructure to support appropriate colonoscopic follow-up for those with a positive FOBT.

GPs were thoroughly briefed on the research project and received copies of the National Health and Medical Research Council (NHMRC) guidelines for FOBT screening and follow-up. All four practices in the selected community agreed to participate. All patients aged 50 to 74 years listed with these practices were sent a BowelScreen intervention package.

The BowelScreen intervention

The BowelScreen intervention package contained: a letter from the practice (signed by the practice doctors), a FOBT kit, instructions on using the kit, information about the research project, and an informed consent form. The !nform kit package also included an informational leaflet concerning bowel cancer and screening. The letter advised that the FOBT may not be suitable for patients with a family history (specifically, two or more first- or second-degree relatives on the same side of the family with CRC diagnosed at any age or at least one first-degree relative with CRC diagnosed before the age of 55), a personal history of CRC or polyps, or symptoms, and that such patients should consult with their GP.

The kit was assigned by practice to minimise concerns related to two different kits being offered, particularly among members of a single household. To optimise the numbers receiving each kit type, the largest and smallest practices were pooled as were the two middle-sized practices. The two groups were then randomly allocated to kit type by flipping a coin. Patients from the largest and smallest practices received the immunochemical kit, and patients from the other two practices received the guaiac test. Those registered with more than one practice received multiple kits and were instructed to utilise the test-kit sent by the practice they usually attend. The initial mail-out was conducted in November 2000.

The BowelScreen project was advertised in local newspapers on three occasions prior to and following the initial mail-out. Posters were placed in the local general practices and pharmacies. A reminder card was mailed to all non-respondents approximately 8 weeks after the initial mailing.

FOBT results were sent to both the practice and the patient. Individuals with a negative result were informed that no further action was required at this time and were encouraged to discuss a regular CRC screening program with their GP. Those with a positive result were instructed to make an appointment with their GP to discuss follow-up testing and were in most cases referred for colonoscopy. Those undergoing colonoscopy were followed up two or more weeks after the procedure to ascertain whether any complications had occurred. FOBT and colonoscopy were available at no cost to individuals in the project.

The FOBT kits

The immunochemical test, !nform (Enterix), requires no dietary restrictions. The test involves use of a brush to transfer toilet water from around the bowel motion to a test card for two consecutive motions. The completed test card can be sent through the mail to the laboratory for analysis. The guaiac test, Hemoccult-II (Beckman Coulter), requires participants to exclude certain items from their diet before and during testing, including red meat, certain vegetables, vitamin C and aspirin[1]. This test requires application of a faecal smear to a test card for three consecutive motions. Consequently it cannot be sent through the mail, and participants had to take their completed test cards to the local hospital for transport to the analytic laboratory. The !nform kits were analysed by the company that manufactures the test, and the Hemoccult-II kits were analysed at a government-funded hospital pathology laboratory. Hemoccult-II samples were not rehydrated.

Data analysis

Of the 3861 individuals contacted by the study, 503 (13.0%) received both immunochemical and guaiac kits. It was not possible to ascertain whether a kit was

being utilised/rejected because of instructions (i.e., participants were instructed to utilise the kit they received from the practice they usually attended) or individual preference. Consequently, participation rates by kit type could not be calculated for this sub-group and they were excluded from analyses, resulting in a sample size of 3358. In some instances, matching patient names appeared across practice lists with different addresses or date of birth information (n=25, 0.7%). For simplicity, these results assume that people with the same name are the same person. The gender of 12 persons (0.4%) and age information for 337 persons (10.0%) were unavailable. These individuals were subsequently excluded from gender-specific and age-specific analyses, respectively.

Overall participation and participation with each kit type were calculated for 3358 individuals. Interactions of kit type by gender or age were tested, but only the latter yielded differences. Positivity rates (blood identified in the sample) were recorded for both types of FOBT kit. Binary logistic regression models examined the association between the outcome variables, participation and positivity, and the independent variables kit type, gender and age-group. Statistical analyses were conducted with SPSS, version 11.5, and SUDAAN, version 7.5.

Colonoscopy outcomes were reviewed by the project's consultant gastroenterologist (BL). The most severe diagnosis was identified for each patient. Stage of cancer, polyp number, size, location and histology were recorded. Adenomas were classified as adenoma of advanced pathology if they were 1 centimetre or more in diameter, had villous or tubulovillous histology or severe dysplasia. The positive predictive value for cancer or adenoma of advanced pathology was calculated. For those completing a kit, additional chi-square and logistic regression analyses were conducted to ascertain the relationships between a diagnosis of advanced pathology (i.e., cancer or an adenoma of advanced pathology) and kit type, gender and age.

Colonoscopy complications, ascertained from medical reports and individual interviews, were also recorded and reviewed by the gastroenterologist.

Finally, we telephoned 88 of the 92 individuals who underwent colonoscopy to assess patients' self-reported complications from the procedure. Three patients diagnosed with cancer and one undergoing barium enema were not contacted. Interview data were collected from 76 of these 88 patients (86.4%). Reasons for not obtaining complication information included: unable to contact after five attempts at different times of day (5), hearing problems (1), non-English speaking (2), unable to recall the procedure (1), unable to access telephone number (2), refusal (1).

Ethical approval

This study was approved by the University Human Research and Ethics Committee at the Queensland University of Technology.

Results

Of the 3358 individuals receiving a single kit type, 2419 (72.0%) received an immunochemical kit and 939 (28.0%) received a guaiac kit. Overall, this represented contact with 92% of the census population[24]. Because the age and gender distributions varied between kit groups (Table 1), multivariable analyses were conducted to adjust for these two demographic characteristics.

Participation

Overall, 1219 kits were completed and returned for analysis, yielding a participation rate of 36.3%. Participation was significantly higher with the immunochemical kit (χ^2

= 20.7, p<0.001), and women were significantly more likely to comply with testing than men (χ^2 = 24.8, p<0.001) (Table 2). Although there was no association between age and participation overall (χ^2 = 4.4, p=0.11), kit type, gender and age were each significantly associated with participation in a model adjusting for all three factors (Table 2). In accordance with bivariate results, persons receiving an immunochemical kit were approximately twice as likely to participate than those receiving a guaiac kit. Women were 43% more likely to participate than men, irrespective of kit type (data not shown).

The association between participation and age was significant at the multivariate level with younger age groups, particularly the 60-69 year olds, less likely to comply compared to the 70-74-year age-group. However, there was evidence of interaction between age and kit type (p=0.01; Figure 1). For those receiving the guaiac test, participation progressively increased with increasing age (27% among those 50-59; 32% among those 60-69; and 35% among those 70-74 years). In contrast, among recipients of the immunochemical test, participation by the youngest (47%) and oldest (49%) age-groups were similar (OR = 0.98; 95% CI: 0.74 - 1.28 comparing 50-59 year-olds and 70-74 year-olds) whereas persons aged 60-69 (40%) were less likely to participate (OR = 0.73; 95% CI: 0.56-0.96 relative to 70-74 year olds).

Positivity rates and colonoscopy outcomes

Of the 1219 kits returned, 100 tests (8.2%) were positive (i.e., blood was found in the faecal sample). Positivity rates varied by kit type, from 3.9% for the guaiac test to 9.5% for the immunochemical test (χ^2= 9.2; p=0.002) (Table 3). Multivariate models, adjusting for kit type, gender and age, revealed statistically significant associations with kit type and gender: those receiving the immunochemical test were three times

more likely than those with the guaiac test to obtain a positive result (OR=3.05; 95% CI: 1.56-5.97); and women were less likely to test positive than men (OR=0.58; 95% CI: 0.38-0.88). Positive FOBT results decreased with decreasing age after adjustment for kit type and gender (OR=0.60 for 50-59 year-olds and OR=0.77 for 60-69 year-olds relative to 70-74 year-olds), but these results were not statistically significant.

Three participants had medical reasons for not pursuing follow-up of a positive FOBT: clear colonoscopy in the last 12 months (1), or co-morbidity (2). Five patients refused colonoscopy, resulting in a compliance rate of 94.8% (92/97). The colonoscope was inserted to the caecum in 97.8% (90/92) of patients. One patient was examined to mid-rectum only, impeded by a cancer. The second patient was examined to the splenic flexure only, and was subsequently referred for barium enema obtaining a normal outcome.

Colonoscopy outcomes by kit type are presented in Table 3. The most severe diagnosis for each participant is recorded. Two cancers were ACPS Stage B lesions in the sigmoid colon and the third was a Stage D lesion in the rectum. All three patients underwent surgery. In addition, two right hemicolectomies were performed for large, sessile, proximal adenomas that could not be removed colonoscopically. The positive predictive value for cancer or adenoma of advanced pathology was 37.8% (95% CI: 28.1%, 48.6%) for the immunochemical test and 40.0% (95% CI: 16.8%, 68.7%) for the guaiac test.

Women were less likely than men, and those utilising the immunochemical kit were more likely that those using the guaiac kit, to receive a diagnosis of advanced pathology. However, these results were not statistically significant at either the bivariate or multivariate levels (Table 4).

Colonoscopy complications

Medical records indicated two post-polypectomy bleeds but both settled without surgery. Three failed colonoscopies were recorded including: one heart failure from colonoscopy preparation; one failed colonoscopy, barium enema conducted; and one case where the instrument could not be passed through cancer. Of the 76 patients interviewed following colonoscopy, 66 (86.8%) reported no complications and 10 reported complications, including: bleeding or pain (4); nausea or vomiting from the preparation liquid (2); nausea or vomiting following the procedure (3); and weight loss, fatigue and diarrhoea for several months following the procedure (1). The reports concerning nausea or vomiting pre- or post-procedure, weight loss, fatigue and diarrhoea were not noted in the specialist medical records.

Discussion

Participation was significantly higher with the immunochemical test kit, !nform, compared to the guaiac test kit, Hemoccult-II. Immunochemical testing resulted in a higher positivity rate than the guaiac test, but this did not translate into a higher false-positive rate. Overall, participation with FOBT screening was modest (36.3%), with women more likely to undergo screening than men. Of those receiving positive FOBT results, only 5% declined appropriate clinical follow-up. A high incidence of significant pathology (38% diagnosed with CRC or advanced adenoma) was observed for those undergoing colonoscopy, and some complications were reported. A diagnosis of advanced pathology was not significantly associated with kit type, gender or age.

Providing an immunochemical kit resulted in greater participation when compared to the guaiac kit. This difference was most apparent for those aged 50-59 years. The

interpretation most consistent with the literature[14-17] is that persons prefer the user-friendly characteristics of the immunochemical test (e.g., more convenient, less messy, no dietary restrictions). Discussion groups with study participants confirmed that these pragmatic aspects of testing were a consideration in participation.[25] A telephone survey conducted prior to this study found that 17% of respondents indicated that dietary restrictions discourage them from taking the test, and this proportion increased with age and was particularly related to medication restrictions.[26] The !nform kit package also included an information leaflet which may have increased compliance, however previous research has reported either no impact from educational leaflets or increased compliance in men only.[27,29] Our results did not indicate an interaction between gender and kit type. In the interest of optimising participation, kit preferences within the community must be taken into account in any future, long-term, mass screening programs. However, because the FOBT kits were offered free of charge in this study, we were unable to assess the extent to which cost may further influence participation in screening activities. At the time of this study, the out-of-pocket costs for an individual to purchase an immunochemical kit were higher than the guaiac kits; yet, when laboratory and related expenses are taken into account, total costs were not very different.

A modest participation rate with FOBT screening is consistent with the literature. Participation rates of 33-67% have been reported previously with a GP recommendation.[19,20,23,27-31] Although conditions for participation were optimised by posting the FOBT kit directly to the home and covering virtually all costs associated with testing and follow-up, participation in the present study remained at the lower end of the published range. It also conflicted with reported intention to screen in this community, as 53% of participants in the earlier telephone survey indicated that they were ‘very likely’ or ‘likely’ to take part in a future FOBT screening.[26] Only minimal efforts (poster, local newspaper advertisements) were made to promote the program.

Public awareness of CRC screening is in its infancy in Australia. In the telephone survey conducted prior to distribution of the FOBT kits,[26] only 27% of respondents recognised the importance of screening for CRC in the absence of symptoms. Like screening for other cancers, such as breast and cervical, it may take several years before the community recognises this test as legitimate and worthwhile.

In addition, high levels of prior CRC testing in this community with tests other than FOBT may also account for a moderate participation rate. The baseline telephone survey indicated that 38% of respondents had undertaken a CRC test other than FOBT in the past, usually colonoscopy (29%).[32] A recent colonoscopy would have made a FOBT unnecessary. Moreover, prior use of FOBT in this community was low (18%).[26] Analyses of intention to participate in FOBT revealed that prior FOBT screening was the most significant predictor of further testing.[32] During the discussion groups, both screening participants and non-participants questioned the efficacy of FOBT screening, revealing a preference for the greater certainty achieved with sigmoidoscopy and colonoscopy.[25] This was echoed by some of the health professionals as well.[25] Promotional activities therefore should particularly target first-time screeners by increasing a sense of familiarity with CRC screening and the use of FOBT as a selection device to indicate which individuals should progress to colonoscopy. Furthermore, informed consent, based on individualised assessment of potential benefits relative to possible risks, harms, and costs, is necessary for the proper conduct of a public health screening program.[33] As individuals may have personal reasons for declining to participate in a CRC screening program, the process of informing potential participants requires additional attention to ensure informed consent.[34,35]

Compliance with colonoscopy follow-up was high amongst those testing positive by FOBT, although the 5% who chose not to undergo colonoscopy is a concern. This

study made provisions so that patients had access to prompt colonoscopy follow-up through private hospital services. It also covered out-of-pocket expenses for those with insurance excesses and those without private health cover. In a national, population-based program, access to timely colonoscopy services may be more problematic as a consequence of limitations in geographic availability of appropriate services and long waiting lists in the public sector. It is worthwhile to note that the threshold for a positive test can be set at different levels in immunochemical tests, allowing control of follow-up rates to match resource availability,[36] although clearly this has ethical implications.

There is controversy about what should be regarded a true-positive result of screening for CRC, and this study lacked statistical power to detect differences in this end-point. However, it is noteworthy that a high number of adenomas, and particularly adenomas of advanced pathology, were detected by both tests. Adenomas are found in up to 40% of asymptomatic subjects undergoing screening colonoscopy, but in such unselected subjects only a small percentage show advanced pathology.[5,7] In general, the risk of an individual adenoma progressing to cancer has been estimated at 1 in 20: this risk may be considerably higher in adenomas of advanced pathology,[37,38] hence removal of these seem likely to reduce the incidence of subsequent CRC.[37,39] We therefore considered detection of either cancer or adenomas of advanced pathology a positive clinical outcome, and these lesions were observed in 38% of those with a positive FOBT who underwent colonoscopy. Despite a much higher positivity rate with the !nform test (10% vs 4% for Hemoccult II), the probability of detecting significant pathology among those with positive FOBT (ie, the positive predictive value) was similar for both tests.

Within the limits of the small number of positive tests in the guaiac arm of this study, the rates of cancer detection (10%), adenoma of advanced pathology (30%), and all

adenomas (60%) are comparable to other studies using this test.[5,7] These studies also reported positivity rates for Hemoccult-II of 2.1% and 1%, respectively, compared to our 4%. In a study of biennial screening, 2.7% of patients had cancer detected and 29.5% had polyps (details of polyps not given).[40] These latter findings are similar to those obtained in the present study with the immunochemical test for positivity and cancer detection. The interesting difference is the immunochemical kit's high positive predictive value for adenomas, and in particular adenomas of advanced pathology. These test characteristics may be very useful if it is accepted that detection and removal of high-risk adenomas is cost effective and likely to reduce CRC mortality and morbidity.

Potentially serious complications were reported for 2-3% of colonoscopies and 9% reported a range of less significant problems. Although two patients had delayed bleeding after polypectomy, each incident was successfully dealt with by conservative means. None of the patients required surgery to manage an adverse event or to complete a polypectomy. Although these rates of complications from colonoscopy may be considered high from a public health perspective, they are based on relatively small numbers and are consistent with the large proportion who had advanced adenomas removed. A national screening program will need to consider the costs of colonoscopy complications against the costs of leaving pathology undetected. Complications related to colonoscopy are also increased if participants with major co-morbidity are included in screening and referred for colonoscopy. One such patient in this series developed heart failure during colonoscopy preparation. Further education of GPs regarding the appropriateness of referrals for FOBT will be an important component of future screening programs.

This study demonstrates the feasibility of community-based screening for CRC using FOBT and highlights some concerns for the proposed national screening program. A

moderate level of participation was achieved among community members with minimal encouragement. More extensive participation will require awareness raising and educational campaigns directed at the community and at health professionals. The availability of an immunochemical FOBT contributed to enhanced participation, although costs were not taken into consideration. The proper analysis of programmatic costs and potential benefits must take into account a range of participation rates, including scenarios where those at greater risk (e.g., men in this sample) may be less inclined to undergo screening. Although the higher positivity rate of the immunochemical test necessarily resulted in increased numbers of colonoscopies, a moderate positive predictive value was maintained, similar to that seen with the guaiac test. Most importantly, infrastructure development for colonoscopy services will be crucial if population-based screening is to be implemented without lengthy delays and difficult access, particularly outside of capital cities and regional centres.

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Table 1: Distribution of participant characteristics by kit type

Demographic characteristic	Immunochemical test N (%)	Guaiac test N (%)	Total N (%)
Gender			
Female	1273 (52.6)	446 (47.5)	1719 (51.2)
Male	1134 (46.9)	493 (52.5)	1627 (48.5)
Missing	12 (0.5)	0 (0.0)	12 (0.4)
Age			
50-59 years	892 (36.9)	454 (48.3)	1346 (40.1)
60-69 years	909 (37.6)	320 (34.1)	1229 (36.6)
70-74 years	282 (11.7)	164 (17.5)	446 (13.3)
Missing	336 (13.9)	1 (0.1)	337 (10.0)

Table 2: Multivariate relationships between participation and gender, age and kit type for participants receiving one kit only

	Number subjects	Participation (%)	Crude OR	Adjusted OR	95% CI	Sig
Gender						<0.001
Female	1719	40.4	1.43	1.43	(1.24,1.66)	
Male	1627	32.1	1.00	1.00	referent	
Age						0.03
50-59	1346	40.5	0.87	0.87	(0.70,1.08)	
60-69	1229	38.3	0.79	0.75	(0.60,0.94)	
70-74	446	43.9	1.00	1.00	referent	
Kit						<0.001
Immuno-chemical	2419	38.7	1.45	1.88	(1.59,2.22)	
Guaiac	939	30.2	1.00	1.00	referent	

Figure 1: Age differences within kit

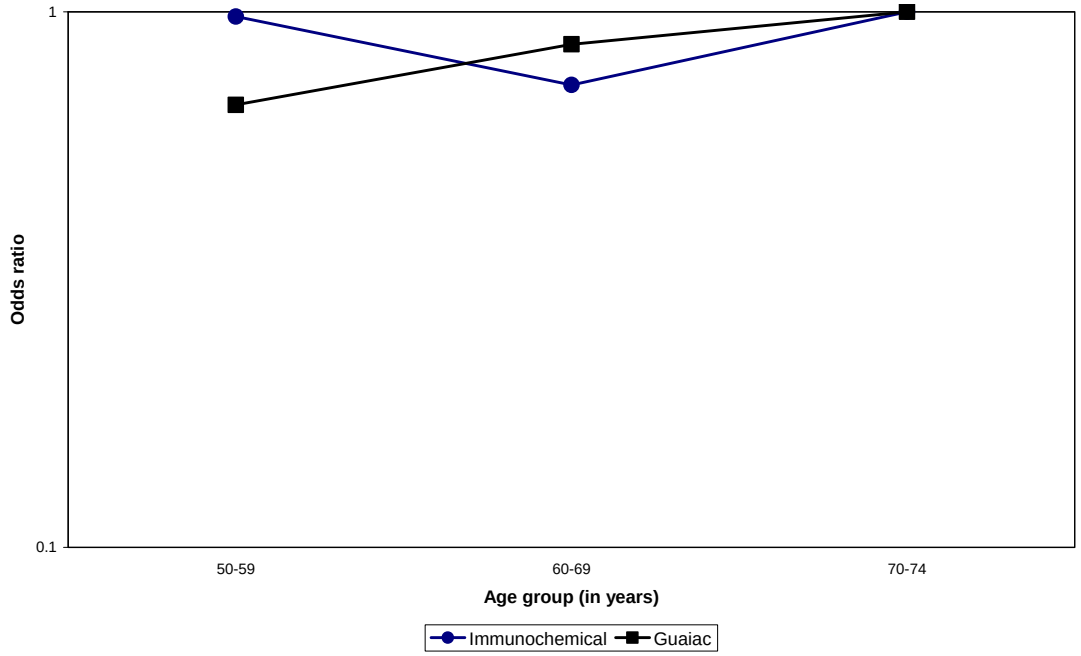

Table 3: Test outcomes by kit type

Clinical Results	Immunochemical N (%)	Guaiac N (%)	Overall N (%)
FOBT Positivity			
Positives	89 (9.5)	11 (3.9)	100 (8.2)
Negatives	846 (90.5)	273 (96.1)	1119 (91.8)
Not analysed	9	1	10
Colonoscopy Outcome[a]			
Cancer	2 (2.4)	1 (10.0)	3 (3.3)
Adenoma advanced pathology	29 (35.4)	3 (30.0)	32 (34.8)
Other adenoma	26 (31.7)	3 (30.0)	29 (31.5)
Hyperplastic polyp	10 (12.2)	0 (0.0)	10 (10.9)
Polyp not otherwise specified	1 (1.2)	0 (0.0)	1 (1.1)
Diverticular disease	9 (11.0)	1 (10.0)	10 (10.9)
Haemorrhoids	2 (2.4)	0 (0.0)	2 (2.2)
Normal	3 (3.7)	2 (20.0)	5 (5.4)

[a] Categories of colonoscopy outcome do not sum to number of positives because of lack of colonoscopy follow-up for some individuals (see results section for more detail).

Table 4: Multivariate relationships between advanced pathology status (diagnosis of cancer or adenoma of advanced pathology) and gender, age and kit type for persons completing a kit

	Number subjects	Advanced pathology (%)	Crude OR	Adjusted OR	95% CI	Sig
Gender						0.08
Female	695	2.2	0.56	0.54	(0.27,1.07)	
Male	523	3.8	1.00	1.00	referent	
Age						0.33
50-59	545	2.4	1.17	1.10	(0.35,3.41)	
60-69	471	3.8	1.91	1.79	(0.60,5.38)	
70-74	196	2.0	1.00	1.00	referent	
Kit						0.10
Immuno-chemical	935	3.3	2.40	2.44	(0.85,6.98)	
Guaiac	284	1.4	1.00	1.00	referent	